Remarks/Arguments

In Paragraph 4 of the Office Action, Claims 1 and 7-12 are rejected under 35 USC § 102(b) as being anticipated by US Patent 4,900,507 to Shallenberger et al. Shallenberger et al. teach a debris filter bottom nozzle that is similar to that of applicants, except applicants provide an improvement in designing the flow-through holes with a profile substantially of a venturi. The only relevant teaching in Shallenberger et al. is provided in connection with the description of Figure 7, which shows a flow-through hole with only the intake side chamfered. The relevant teaching is provided in column 6, starting at line 6, where Shallenberger et al. states:

> As seen in Figure 7, a long taper inlet chamfer 50, about 0.140 inch in length and forming an angle of about 12 to 15 degrees to the axis of the hole 48, is employed on each of the flow holes 48 to optimize the flow, i.e., minimize the loss coefficient increase due to the higher friction effect inherent with smaller flow holes 48. The longer chamfers 50 will prevent the flow stream from reattaching within the adapter plate holes 48 and increasing pressure drop across the fuel assembly 10. Any increase in pressure drop across the fuel assembly with the debris filter bottom nozzle 12 compared to an assembly with the conventional bottom nozzle 12A would be undesirable and very likely unacceptable.

In contrast, applicants provide the flow through holes with a profile substantially that of a venturi. The Examiner had equated Shallenberger et al. flow holes to that of a venturi. However, Webster's Seventh New Collegiate Dictionary defines a venturi as:

> A short tube that is inserted into a pipeline that has flaring ends connected by a constricted middle, that depends for operation upon the fact that as the velocity of flow of fluid increases in the constricted part the pressure decreases.

Shallenberger et al. clearly does not have a flaring at both ends of the flow through holes, which distinguishes from applicants' claim. To make this perfectly clear, applicants have amended Claims 1 and 12 to specifically identify that the venturi has flaring at both ends. As stated in *In re: Marshall* 578 F2d 301, 198 USPQ 344 (CAFC, 6/30/78), "To constitute an anticipation, all material elements recited in a claim must be found in one unit of prior art...An accidental or unwitting duplication of an invention cannot constitute an anticipation." Clearly, Shallenberger et al. does not teach a venturi with flaring at both ends. Accordingly, the rejection in Paragraph 4 under 35 USC § 102(b) is clearly improper and should be withdrawn. Claims 7-12 were similarly rejected and the latter rejection should be withdrawn for the same reason.

In Paragraph 5 of the Office Action, Claim 2 is rejected under 35 USC § 103(a) as being unpatentable over Shallenberger et al. in view of either the Mechanical Engineering Handbook,

CRC Press LLC, ©1999 or the Industrial Burners Handbook, CRC Press LLC ©2003. In support of the rejection, the Examiner asserted:

> Shallenberger et al. discloses applicants' invention substantially as claimed and described above, however, Shallenberger et al. does not disclose that the flow through holes include a chamfer on the outlet end.
>
> Fluid Mechanics, in Chapter 3 of Mechanical Engineers Handbook, CRC Press LLC ©1999 teaches on page 3-190 that a conical diffuser section downstream from the throat of Venturi gives excellent pressure recovery.
>
> Chapter 3 Fluid Flow of the Industrial Burners Handbook, CRC Press LLC ©2003 also teaches in Figure 3.3 and Section 3.3.3 that a conical diffuser section downstream of the throat of a venturi provides a transition to the downstream section and that typically this section is designed with small transition angles to provide smooth flow in order to reduce pressure losses.

The Examiner felt that both of these references are analogous art because they deal with the specific geometries and principles of venturis. The Examiner thus concluded that, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to provide a chamfer on the outlet of the flow through holes in order to further reduce pressure losses and provide smoother flow downstream, as such results are no more than basic mechanical principles of fluid flow dynamics available within the art.

Applicants specifically take issue with the Examiner's conclusion that both of the fluid mechanics references are analogous art. First of all, Shallenberger et al. does not describe, teach or show flow through holes with flaring at both ends, as previously noted, nor is there any teaching in Shallenberger et al. of the use of a venturi for the flow through holes. In describing the flow through holes shown in Figure 7 of Shallenberger et al. with chamfered inlets, the reference states in column 6, starting at line 12, that "The longer chamfers 50 will prevent the flow stream from reattaching within the adapter plate holes 48 and increasing pressure drop across the fuel assembly 10." This teaching seems to teach away from adding a further chamfer at the outlet or using the flow through holes as a venturi. It is only after resort to applicants' teachings in the instant specification of the application under examination does such a teaching seem like a good idea. Furthermore, none of the fluid mechanics references cited by the Examiner describe, teach or even suggest employing venturis within the bottom nozzle of a pressurized water nuclear reactor. Accordingly, the fluid mechanics handbooks should not be considered analogous art. The Mechanical Engineers Handbook provides a general discussion of

venturis which are typically used for measuring flow rates. The Industrial Burners Handbook discusses the eduction process, which is a form of jet pump, used to mix a combustible fuel and air in a burner. Neither has any correlation to the flow through holes in the bottom nozzle of a pressurized water nuclear reactor. In *In re: Ehrreich* 590 F.2d 902, 200 USPQ 504 (February 2, 1979), the U.S. Court of Customs and Patent Appeals stated, with regard to Section 103(a), at page 909, that: "We must consider the entirety of the disclosure made by the references, and avoid combining them indiscriminately". In *In re: Fitch* 972 F.2d 1260, 23 USPQ 2d 1780 (CAFC, 8/11/92), the court stated: "Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination... The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification... Here, the Examiner relied upon hindsight to arrive at the determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or template to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has stated that "[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention".

It is respectfully asserted that there is no teaching in either of the references that would suggest the combination and that the Examiner is improperly using hindsight and resort to applicants' disclosure to reconstruct the references to meet applicants' claims, which is not proper. Accordingly, it is respectfully requested that the rejection in Paragraph 5 of the Office Action be withdrawn.

In Paragraph 6 of the Office Action, Claims 3, 4, 6 and 13-17 are rejected under 35 USC § 103(a) as being unpatentable over Shallenberger et al. as modified by either the Mechanical Engineering Handbook or the Industrial Burners Handbook and further in view of the Mechanical Engineering Handbook, Sixth Edition, McGraw Hill Book Company, Inc., ©1958. The Examiner relied upon the Mechanical Engineering Handbook and the Industrial Burners Handbook in combination with Shallenberger et al. as applied in the rejection presented in Paragraph 5 of the Office Action and added the Mechanical Engineering Handbook, Sixth Edition, McGraw Hill Book Company, Inc. reference in an attempt to render obvious a double angle chamfer on the inlet end. In support of this rejection, the Examiner asserted that:

> Chapter 3, pages 59-65 of the Mechanical Engineering Handbook, Sixth Edition, McGraw Hill Book Company, Inc., ©1958 also teach fluid flow through venturis and orifice and that beveling the sharp upstream edge, even slightly, increases the discharge of an orifice (see page 3-64 Rounding). Rounding the inlet edge of an orifice can obviously take many forms (Fig. 6), from multiple angle bevels, to rounding. In the case of a rounded edge, it is understood that the inlet angle would be comprised of an infinite number of chamfer angles, including those proposed by applicant.

For the reasons stated previously, the Examiner considered the Mechanical Engineering Handbook, Sixth Edition, McGraw Hill Book, Inc. as analogous art, though there is no mention in the reference of employing a venturi of any sort in the bottom nozzle of a pressurized water nuclear reactor. The section cited by the Examiner is under the heading Liquids in Motion; General Considerations Regarding Flow and Flow-through Orifices and Nozzles. Thus, neither of the three mechanical engineering handbooks suggest applying a venturi or double chamfered venturi exit orifice to a bottom nozzle of a pressurized water nuclear reactor and Shallenberger et al. neither describe, teach or show or even suggest employing a venturi for that purpose. Accordingly, for this further reason, in addition to those previously mentioned, it is respectfully asserted that the Mechanical Engineering Handbook is non-analogous art and applicants' claims are not obvious. Accordingly, the rejection in Paragraph 6 of the Office Action with regard to Claims 3, 4, 6 and 13-17 should be withdrawn.

In Paragraph 6 of the Office Action, the Examiner also stated that Claims 6 and 17 are disclosed in the Mechanical Engineers Handbook, Sixth Edition, McGraw Hill Book Company, Inc. ©1958, Section 3, pages 59-65, suggesting that applicants have converted the table in Claim 5 into mathematical equations stemming from typical venturi and orifice geometric relationships. The Examiner felt that applicants' table and values are no more than standard mechanical properties/geometric relationships available within the art. To support this proposition, the Examiner cited MPEP 2114.05 II. Applicants' copy of the MPEP, Revision 2, May 2004, does not have a Section 2114.05 II. It is respectfully believed that the Examiner has the wrong citation. In any event, applicants have shown where the general conditions of applicants' claims are not disclosed in the prior art.

In Paragraph 7 of the Office Action, Claim 5 stands rejected under 35 USC § 103(a) as being unpatentable over Shallenberger et al. as modified by either the Mechanical Engineering Handbook, CRC Press LLC, or the Industrial Burners Handbook, CRC Press LLC and the

Mechanical Engineering Handbook, Sixth Edition, McGraw Hill Book Company, Inc., as previously applied by the Examiner and further in view of Chapter 42 Fluid Measurements of the Engineering Handbook CRC Press LLC. The additional reference was cited to show a venturi tube with a diffuser section angle range of between 5-15 degrees. However, the venturi tube illustrated in Figure 42.6 of the additionally cited reference provides the diffuser in combination with an angled inlet of between 19 to 23 degrees. In contrast, applicants' Claim 5 calls for a chamfer at the inlet of 35 degrees, in combination with a double chamfered outlet of respectively 15 degrees and 10 degrees. In this instance, it appears the Examiner is using applicants' claimed invention as an instruction manual or template to piece together the teachings of the prior art so that the claimed invention is rendered obvious, which the courts have stated is not proper.

In Paragraph 7 of the Office Action, the Examiner cited MPEP Sections 2131.03 II, 2144.05 as well as the previously cited MPEP 2114.05 II, which was previously noted as a miscitation and is believed to be MPEP Section 2144.05 II. MPEP 2131.03 II states in part:

> When the prior art discloses a range which touches, overlaps or is within the claimed range, but no specific examples falling within the claimed range are disclosed, a case by case determination must be made as to anticipation. In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with "sufficient specificity to constitute an anticipation under the statute". What constitutes a "sufficient specificity" is fact dependent...

Here, the Examiner is trying to isolate the ranges rather than considering the combination of ranges, which are claimed together, which is not what the MPEP or the court holdings intend. MPEP 2144.05 I discusses overlapping ranges in a chemical composition context and is not intended to anticipate combinations of angles that are nowhere described, taught or shown in the references. Similarly, MPEP 2144.05 II discusses the optimization of ranges and states:

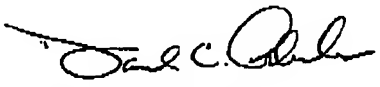
> Generally, differences in concentration or temperature will not support the patentability of a subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical.

Again, the MPEP section is referring to chemical ranges, not combinations of mechanical angles with specified tolerances. Accordingly, the rejection raised in Paragraph 7 of the Office Action is improper and should be withdrawn.

The specification has been amended as suggested by the Examiner in Paragraph 2 of the Office Action and Claim 17 has been amended to overcome the rejection raised in Paragraph 3 of the Office Action.

The formal matters having been attended to and each of the rejections addressed, it is respectfully believed that this application is now in condition for allowance. Reconsideration, allowance and passage to issue of this application are therefore requested.

Respectfully submitted,



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